

AMENDED SPECIFICATION

Reprinted as amended in accordance with the Decision of the Superintending Examiner acting for the Comptroller-General dated the twentieth day of October, 1958, under Section 14, of the Patents Act, 1949.

PATENT SPECIFICATION



Inventor: KENNETH KNAPTON DAVIES

776.382

Date of filing Complete Specification: Sept. 1, 1955.

Application Date: Dec. 17, 1954.

No. 36656/54.

Complete Specification Published: June 5, 1957.

Index at acceptance:—Class 94(2), E2(G5:K1:K3:K4:M).

International Classification:—B65d.

COMPLETE SPECIFICATION

An improved Bag and method of making same

5 We, THE METAL BOX COMPANY LIMITED, a Company incorporated under the laws of Great Britain, of The Langham, Portland Place, London, W.1, England, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to a bag made of foldable material, such as paper, aluminium foil or other suitable material coated on the side thereof which faces the interior of the bag with a covering of thermoplastic material, for example, polyethylene, and to a method of making the bag.

15 The invention is concerned with a collapsible bag made of foldable material the side thereof which faces the interior of the bag being of thermoplastic material and which in the collapsed condition thereof has two opposed sides connected by gussets extending from an open to a closed end of the bag, each said gusset consisting of two bag portions infolded one from each said side to overlie each other and to lie between said sides, and it is an object of the invention so to construct the closed end of the bag that when the bag is set-up in the open condition thereof it is of substantially rectangular cross-section and has a bottom substantially at right angles to the sides thereof.

20 According to the present invention there is provided a collapsible bag made of foldable material having on the side thereof which faces the interior of the bag a coating of thermoplastic material, for example polyethylene, and having in the collapsed condition thereof two opposed sides connected by

25

30

35

gussets extending from the open to the closed end of the bag, each gusset consisting of two bag portions infolded one from each said side to overlie each other and to lie between said sides, wherein the bag is provided with an end seal formed by end portions of the two sides being heat-sealed one to the other and to the coated gusset portions facing the respective sides, and by one portion of each gusset being secured to one of said side end portions through an aperture extending through the other portion of the gusset, and wherein a bottom-defining crease is formed in the bag at right-angles to the length thereof to extend through both sides of the bag and the gussets, and a bottom setting-up seal provided between said crease and end seal is to be parallel to said bottom-defining crease and to seal together the opposed bag sides between the gussets, to seal the side portions of the gussets facing them and to co-operate with sloping seals securing gusset portions to said sides and extending from the vicinity of the opposite ends of the bottom-defining crease to the vicinity of said bottom setting-up seal whereby during setting-up of the bag to the open condition thereof the said gusset portions are constrained to overlie the interior of the bag bottom thereby to facilitate the formation of a substantially rectangular bottom which is substantially at right-angles to the sides of the bag. Creases may be formed in the bag adjacent said bottom setting-up seal and sloping seals to facilitate the setting-up of the substantially rectangular bottom of the bag. The bag portion which includes said end seal may be folded about said bottom setting-up seal to overlie one of said bag sides and be sealed thereto.

40

45

50

55

60

65

70

75

[Price 3s. 6d.]

Price 25p

BEST AVAILABLE COPY

Further there is provided a method of making a collapsed bag according to the invention which method includes the steps of forming in a length of foldable material having on one side a coating of a thermoplastic material, for example polyethylene, pairs of apertures which are spaced apart lengthwise of the coated paper at positions adjacent to the portion thereof which is to be formed into the closed end of a bag and which are spaced apart transversely of the length of the material and located in portions thereof which are to be unfolded to form gussets, forming the punched material into a tube having a longitudinal sealed seam with the coated side of the material on the inside of the tube, infolding the tube from opposite sides in regions thereof in which said apertures are located thereby to reshape the tube so that it has two opposed side portions connected by gussets each consisting of two overlying tube portions disposed between the two opposed side portions, flattening the reshaped tube, and closing the end portion of the bag length which includes said apertures by an end seal formed by heat-sealing to each other the opposed coated end portions of said opposed side portions, the coated gusset portions facing the respective opposed side portions in the region of the seal, and one portion of each gusset to one of said opposed side portions through the aperture formed in the other portion of the gusset, forming in the flattened bag length a bottom-defining crease at right angles to the length of the bag length and a bottom setting-up seal parallel thereto and disposed between it and said end seal, said crease extending through both said opposed side portions and the gussets and the bottom setting-up seal securing opposed bag side portions between the gussets and gusset portions facing the sides to the sides, forming in the flattened bag length sloping seals which extend from the vicinity of the opposite ends of the bottom-defining crease to the vicinity of the bottom setting-up seal and which secure opposed gusset portions to each other thereby to provide lines of constraint about which the gussets can be folded during the setting-up of the bag to the open condition thereof, folding the bag portion which includes said end seal at a position adjacent the bottom-defining seal to overlie one of the opposed side portions and securing said last folded portion to said one side portion.

In order that the invention may be clearly understood some embodiments thereof will now be described, by way of example, with reference to the drawings accompanying the Provisional Specification and in which:—

Fig. 1 illustrates pictorially a portion of a web from which bags are formed,

Fig. 2 is a broken view pictorially illustrating a bag length before closing of the bottom

thereof, the bag length in this figure being for clarity shown in a partially open condition thereof,

Fig. 3 is a broken view illustrating the bag length of Fig. 2 with an end thereof closed by a heat-sealing process.

Fig. 4 is a broken view pictorially illustrating a completed bag in a partially set-up condition thereof.

Fig. 5 is a broken view pictorially illustrating the bag of Fig. 4 in the set-up condition, and

Fig. 6 is a view similar to that of Fig. 2, but illustrates an alternative method of forming a longitudinal seam in the bag.

Referring to the drawings, bags are made from a web 1 of foldable material, for example paper which is coated on one side thereof with a covering of thermoplastic material 2, which thermoplastic material may, for example, be polyethylene. It is, however, to be understood that the base material 1 may consist of any suitable material other than paper, such for example as aluminium foil, one side of which is coated with a covering of thermoplastic material.

As the web is advanced through a bag-forming machine pairs of apertures 3 are punched through the coated web, the pairs of apertures, as shown in Fig. 1, being spaced apart lengthwise of the web and disposed at positions adjacent to the portions thereof which, as described below, are to be formed into the close ends of the bags. The pairs of apertures are spaced apart transversely of the coated web and arranged in portions of the coated web which, as described below, are to be infolded to form gussets. The coated web, after punching, is formed into a tube having a longitudinal seam formed by overlying portions 4, 5, which, in the tube shown in Fig. 2, are secured together by heat-sealing S or by the use of a suitable adhesive. If desired, however, the seam may be formed in the manner illustrated in Fig. 6, in which figure the coating 2 has an edge portion 6 which extends beyond the longitudinal edge of the web 1 so that the portion 6 can, in addition to seal S, be secured to the overlying portion of the tube by a heat-seal S1 formed between the coating portion 6 and the coating 2 applied to the overlying portion of the tube.

After forming of the longitudinal seam the tube is engaged by folding elements which, in known manner, co-act with opposite sides of the tube to infold the tube from opposite sides thereof in the regions in which the apertures 3 are located thereby to reshape the tube so that it has two opposite side portions 7, 8 connected by gussets each consisting of overlying tube portions 9, 10 disposed between the opposed side portions 7, 8. As can be seen from Fig. 2, the apertures 3 are now located in the gusset portions 10. The reshaped tube

is then flattened and the bottom of the bag length closed by an end seal 11 formed by heat sealing to each other the opposed coated end portions of the opposed sides 7 and 8 as illustrated in Fig. 3. The formation of the end seal 11 also secures to the side 8 the coated surfaces of the gusset portions 10 and the coated surfaces of the gusset portions 9 are secured to the side 7. The pressure applied during the formation of the heat-seal is such that the paper or other base material 1 faces the apertures 3 into engagement with the heated thermoplastic material on the side 8 so that the surfaces 12 of the gusset portions 9 are caused to adhere to the side 8 through the apertures 3 in the region of the heat-seal.

After, or if desired before, formation of the heat-seal 11, the bag is provided, as shown in Fig. 3, with a bottom-defining crease 13 applied to the bag at right angles to the length thereof, a bottom setting-up seal 14 parallel to the crease 13 and disposed between the crease 13 and the end seal 11, and two sloping heat-seals 15 which extend one from about each of the opposite ends of the crease 13 towards and to, or substantially to, the seal 14. The heat-seal 14 secures together the sides 7, 8 between the gussets and also secures the gusset portions 9, 10 to the sides 7, 8. The crease 13 is so formed that it is impressed on the bag length to extend through both sides 7, 8 and each of the gusset portions 9, 10. The heat-seals 15 join the gusset portions 9, 10 respectively to the sides 7, 8 so that when the bag is set-up, as shown in Fig. 5, the gusset portions 18 which are sealed to the sides 7, 8 are constrained by the seals to be folded inwards to overlie the rectangular bottom of the bag. If desired, to facilitate the inward folding of the gusset portions 18, creases 14a, 15a may be provided, the creases 14a, 15a also extending through both sides 7, 8 and each of the gusset portions 9, 10.

After formation of the crease 13, and if included the creases 14a, 15a, and the formation of the heat-seals 11, 14 and 15, and after the bag length is severed from the web, the end portion 16 of the bag which extends between the end 17, Fig. 3, and the seal 14 is folded about the crease 14a to overlie the side 7 as illustrated in Fig. 4, and the overlying portion 16 is secured by any suitable adhesive to the side 7. If desired, the end portion of the bag may be so formed that in addition to the over-folded portion 16 being adhesively secured to the side 7, it may also be secured by a heat-seal formed between the overlying portions, such heat-seal being formed in a manner similar to that described above, with reference to Fig. 6, by providing for an extension of the material 12 to overlie the paper exterior of the bag and be sealed thereto.

When the bag shown in Fig. 4 is in the

set-up open condition thereof, it has the form shown in Fig. 5 and is of substantially rectangular cross-section throughout its length and has a bottom which is substantially at right angles of the length of the bag. During the setting-up of the bag the bottom-defining crease 13 folds about the lines 13a, 13b, 13c, 13d, Fig. 5, the lines 13b and 13d being those portions of crease 13 which were impressed into the gusset portions 9 and 10. The sloping seals 15, and if provided the creases 15a, constrain the portions 18 of the gussets to overlie the interior of the bottom of the bag and permit the gusset portions 9 and 10 on the opposite sides of the bag to open out fully along the full length of the bag as illustrated in Fig. 5.

If desired, the crease 13 may be made in the material before folding thereof to form the tube, and when creases 15a are provided these also may be made before folding the material to form the tube. Further, the crease 14a, when provided, may be either formed before folding of the material or by the operation of folding the portion 16 to overlie the side 7 of the bag.

WHAT WE CLAIM IS:—

1. A collapsible bag made of foldable material having on the side thereof which faces the interior of the bag a coating of thermoplastic material, for example polyethylene, and having in the collapsed condition thereof two opposed sides connected by gussets extending from the open to the closed end of the bag, each gusset consisting of two bag portions infolded one from each said side to overlie each other and to lie between said sides, wherein the closed end of the bag is provided with an end seal formed by end portions of the two sides being heat-sealed one to the other and to the coated gusset portions facing the respective sides, and by one portion of each gusset being secured to one of said side end portions through an aperture extending through the other portion of the gusset, and wherein a bottom-defining crease is formed in the bag at right-angles to the length thereof to extend through both sides of the bag and the gussets, and a bottom setting-up seal is provided between said crease and end seal to be parallel to said bottom-defining crease and to seal together the opposed bag sides between the gussets, to seal the side portions of the gussets facing them and to co-operate with sloping seals securing gusset portions to said sides and extending from the vicinity of the opposite ends of the bottom-defining crease to the vicinity of said bottom setting-up seal whereby during setting-up of the bag to open condition thereof the said gusset portions are constrained to overlie the interior of the bag bottom thereby to facilitate the formation of a substantially rectangular bottom which is substantially at right-angles to the sides of the bag.

2. A bag according to claim 1, wherein creases are formed in the bag adjacent said bottom setting-up seal and sloping seals to facilitate the setting-up of the substantially rectangular bottom of the bag.
3. A bag according to claim 1 or claim 2, wherein the bag portion which includes said end seal is folded about said bottom setting-up seal to provide one of said bag sides and is sealed thereto.
4. A method of making a collapsed bag according to claim 1, which includes the steps of forming in a length of foldable material having on one side a coating of thermoplastic material, for example polyethylene, pairs of apertures which are spaced apart lengthwise of the material at positions adjacent to the portion thereof which is to be formed into the closed end of a bag and which are spaced apart transversely of the length of the material and located in portions thereof which are to be infolded to form gussets, forming the punched material into a tube having a longitudinal sealed seam with the coated side of the material on the inside of the tube, infolding the tube from opposite sides in regions thereof in which said apertures are located thereby to reshape the tube so that it has two opposed side portions connected by gussets each consisting of two overlying tube portions disposed between the two opposed side portions, flattening the reshaped tube, closing the end portion of the bag length which includes said apertures by an end-seal formed by heat-sealing to each other the opposed coated end portions of said opposed side portions, the coated gusset portions facing the respective opposed side portions in the region of the seal, and one portion of each gusset to one of said opposed side portions, through the aperture formed in the other portion of the gusset, forming in the flattened bag length a bottom-defining crease at right angles to the length of the bag length and a bottom setting-up seal parallel thereto and disposed between it and said end seal, said crease extending through both said opposed side portions and the gussets and the bottom setting-up seal securing opposed bag side portions between the gussets and gusset portions facing the sides to the sides, forming in the flattened bag length sloping seals which extend from the vicinity of the opposite ends of the bottom-defining crease to the vicinity of the bottom setting-up seal and which secure opposed gusset portions to each other thereby to provide lines of constraint about which the gussets can be folded during the setting-up of the bag to open condition thereof, folding the bag portion which includes said end seal at a position adjacent the bottom-defining seal to overlie one of the opposed side portions, and securing said last folded portion to said one side portion.
5. A collapsible bag constructed and arranged for use substantially as herein described with reference to Figs. 1 to 5, or modified as described with reference to Fig. 6, of the drawings accompanying the Provisional Specification.
6. A method of making a bag according to claim 1, substantially as herein described with reference to Figs. 1 to 5, or modified substantially as described with reference to Fig. 6, of the drawings accompanying the Provisional Specification.

PAGE, WHITE & FARRER,
Chartered Patent Agents,
27, Chancery Lane,
London, W.C.2,
Agents for the Applicants.

PROVISIONAL SPECIFICATION

An improved Bag and method of making same

We, THE METAL BOX COMPANY LIMITED, a Company incorporated under the laws of Great Britain, of The Langham, Portland Place, London, W.1, England, do hereby declare this invention to be described in the following statement:—

This invention relates to a bag made of paper coated on the side thereof which faces the interior of the bag with a covering of thermoplastic material, for example polyethylene, and to a method of making the bag.

It is a main object of the invention to provide with an improved form of closed end a collapsible bag made of paper coated on the side thereof which faces the interior of the bag with a covering of thermoplastic material and which in the collapsed condition thereof has two opposed sides connected by gussets extending from the open to the closed end

of the bag, each said gusset consisting of two bag portions infolded one from each said side to overlie each other and to lie between said sides. It is a further object of the invention so to construct the closed end of the bag that when the bag is set-up in the open condition thereof it is of substantially rectangular cross-section and has a bottom substantially at right angles to the sides thereof.

According to the present invention there is provided a collapsible bag made of paper coated on the side thereof which faces the interior of the bag with a covering of thermoplastic material, for example polyethylene, and having in the collapsed condition thereof two opposed sides connected by gussets extending from the open to the closed end of the bag, each gusset consisting of two bag portions infolded one from each said side to overlie

each other and to lie between said sides, wherein the bag is provided with an end seal formed by end portions of the two sides being heat-sealed one to the other and to the coated gusset portions facing the respective sides, and by one portion of each gusset being secured to one of said side end portions through an aperture extending through the other portion of the gusset.

10 A bottom-defining crease may be formed in the bag at right-angles to the length thereof to extend through both sides of the bag and the gussets, and a bottom setting-up seal provided between said crease and end seal to be parallel to said bottom-defining crease and to seal together the opposed bag sides between the gussets, to seal the side portions of the gussets facing them and to co-operate with sloping seals securing gusset portions to said sides and extending from the vicinity of the opposite ends of the bottom-defining crease to the vicinity of said bottom setting-up seal whereby during setting-up of the bag to the open condition thereof the said gusset portions are constrained to overlies the interior of the bag bottom thereby to facilitate the formation of a substantially rectangular bottom which is substantially at right-angles to the sides of the bag. Creases may be formed in the bag adjacent said bottom setting-up seal and sloping seals to facilitate the setting-up of the substantially rectangular bottom of the bag. The bag portion which includes said end seal may be folded about said bottom setting-up seal to overlies one of said bag sides and be sealed thereto.

Further there is provided a method of making a collapsed bag according to the invention which method includes the steps of forming in a length of paper coated on one side with a covering of thermoplastic material, for example polyethylene, pairs of apertures which are spaced apart lengthwise of the coated paper at positions adjacent to the portion thereof which is to be formed into the closed end of a bag and which are spaced apart transversely of the length of the coated paper and located in portions thereof which are to be infolded to form gussets, forming the punched coated paper into a tube having a longitudinal sealed seam with the coated side of the paper on the inside of the tube, infolding the tube from opposite sides in regions thereof in which said apertures are located thereby to reshape the tube so that it has two opposed side portions connected by gussets each consisting of two overlying tube portions disposed between the two opposed side portions, flattening the reshaped tube, and closing the end portion of the bag length which includes said apertures by an end seal formed by heat-sealing to each other the opposed coated end portions of said opposed side portions, the coated gusset portions facing the respective opposed side portions in the region

of the seal, and one portion of each gusset to one of said opposed side portions through the aperture formed in the other portion of the gusset.

A flattened bag length may be prepared to form a bag which, when opened, is of substantially rectangular cross-section with a bottom substantially at right angles to the sides thereof by forming in the flattened bag length a bottom-defining crease at right angles to the length of the bag length and a bottom setting-up seal parallel thereto and disposed between it and said end seal, said crease extending through both said opposed side portions and the gussets and the bottom setting-up seal securing opposed bag side portions between the gussets and gusset portions facing the sides to the sides, forming in the flattened bag length sloping seals which extend from the vicinity of the opposite ends of the bottom-defining crease to the vicinity of the bottom setting-up seal and which secure opposed gusset portions to each other thereby to provide lines of constraint about which the gussets can be folded during the setting-up of the bag to the open condition thereof, and by folding the bag portion which includes said end seal adjacent the bottom-defining seal to overlies one of the opposed side portions and be secured to said one side portion.

In order that the invention may be clearly understood some embodiments thereof will now be described, by way of example, with reference to the accompanying drawings in which:—

Fig. 1 illustrates pictorially a portion of a web from which bags are formed,

Fig. 2 is a broken view pictorially illustrating a bag length before closing of the bottom thereof, the bag length in this figure being for clarity shown in a partially open condition thereof,

Fig. 3 is a broken view illustrating the bag length of Fig. 2 with an end thereof closed by a heat-sealing process,

Fig. 4 is a broken view pictorially illustrating a completed bag in a partially set-up condition thereof,

Fig. 5 is a broken view pictorially illustrating the bag of Fig. 4 in the set-up condition, and

Fig. 6 is a view similar to that of Fig. 2, but illustrating an alternative method of forming a longitudinal seam in the bag.

Referring to the drawings, bags are made from a web 1 of part which is coated on one side thereof with a covering of thermoplastic material 2, which material may, for example, be polyethylene. As the web is advanced through a bag-forming machine pairs of apertures 3 are punched through the coated web, the pairs of apertures, as shown in Fig. 1, being spaced apart lengthwise of the web and disposed at positions adjacent to the portions thereof which, as described below, are

to be formed into the closed ends of the bags. The pairs of apertures are spaced apart transversely of the coated web and arranged in portions of the coated web which, as described below, are to be infolded to form gussets. The coated web, after punching, is formed into a tube having a longitudinal seam formed by overlying portions 4, 5, which, in the tube shown in Fig. 2, are secured together by heat-sealing S or by the use of a suitable adhesive. If desired, however, the seam may be formed in the manner illustrated in Fig. 6, in which figure the coating 2 has an edge portion 6 which extends beyond the longitudinal edge of the web 1 so that the portion 6 can, in addition to seal S, be secured to the overlying portion of the tube by a heat-seal Si formed between the coating portion 6 and the coating 2 applied to the overlying portion of the tube.

After forming of the longitudinal seam the tube is engaged by folding elements which, in known manner, co-act with opposite sides of the tube to infold the tube from opposite sides thereof in the regions in which the apertures 3 are located thereby to reshape the tube so that it has two opposed side portions 7, 8 connected by gussets each consisting of overlying tube portions 9, 10 disposed between the opposed side portions 7, 8. As can be seen from Fig. 2, the apertures 3 are now located in the gusset portions 10. The reshaped tube is then flattened and if it is not desired that in the set-up condition of the bag, the bag shall be of substantially rectangular cross-section throughout its length, the bottom of the bag length is closed by an end seal 11 formed by heat-sealing to each other the opposed coated end portions of the opposed sides 7 and 8 as illustrated in Fig. 3. The formation of the end seal 11 also secures to the side 8 the coated surfaces of the gusset portions 10 and the coated surfaces of the gusset portions 9 are secured to the side 7. The pressure applied during the formation of the heat-seal is such that the paper faces 12 of the gusset portions 9 are pressed through the apertures 3 into engagement with the heated thermoplastic material on the side 8 so that the surfaces 12 of the gusset portions 9 are caused to adhere to the side 8 through the apertures 3 in the region of the heat-seal. After formation of the closed end of the bag the bag length is severed from the web.

If it is desired that the bag in the set-up open condition thereof be of substantially rectangular cross-section throughout the length of the bag, the bag is provided, before or after formation of the heat-seal 11, as shown in Fig. 3, with a bottom-defining crease 13 applied to the bag at right angles of the length thereof, a bottom setting-up seal 14 parallel

to the crease 13 and disposed between the crease 13 and the end seal 11, and two sloping heat-seals 15 which extend one from about each of the opposite ends of the crease 13 towards and to, or substantially to, the crease 14. The heat-seal 14 secures together the sides 7, 8 between the gussets and also secures the gusset portions 9, 10 to the sides 7, 8. The crease 13 is so formed that it is impressed on the bag length to extend through both sides 7, 8 and each of the gusset portions 9, 10. The heat-seals 15 join the gusset portions 9, 10 respectively to the sides 7, 8 so that when the bag is set-up, as shown in Fig. 5, the gusset portions 18 which are sealed to the sides 7, 8 are constrained by the seals to be folded inwards to overlie the rectangular bottom of the bag. If desired, to facilitate the inward folding of the gusset portions 18, creases, 14a, 15a may be provided, the creases 14a, 15a also extending through both sides 7, 8 and each of the gusset portions 9, 10.

After formation of the crease 13, and if included the creases 14a, 15a, and the formation of the heat-seals 11, 14 and 15, the end portion 16 of the bag which extends between the end 17, Fig. 3, and the crease 14 is folded about the crease 14 to overlie the side 7 as illustrated in Fig. 4, and the overlying portion 16 is secured by any suitable adhesive to the side 7. If desired, the end portion 16 of the bag may be so formed that in addition to the over-folded portion 16 being adhesively secured to the side 7, it may also be secured by a heat-seal formed between the overlying portions, such heat-seal being formed in a manner similar to that described above, with reference to Fig. 6, by providing for an extension of the material 12 to overlie the paper exterior of the bag and be sealed thereto.

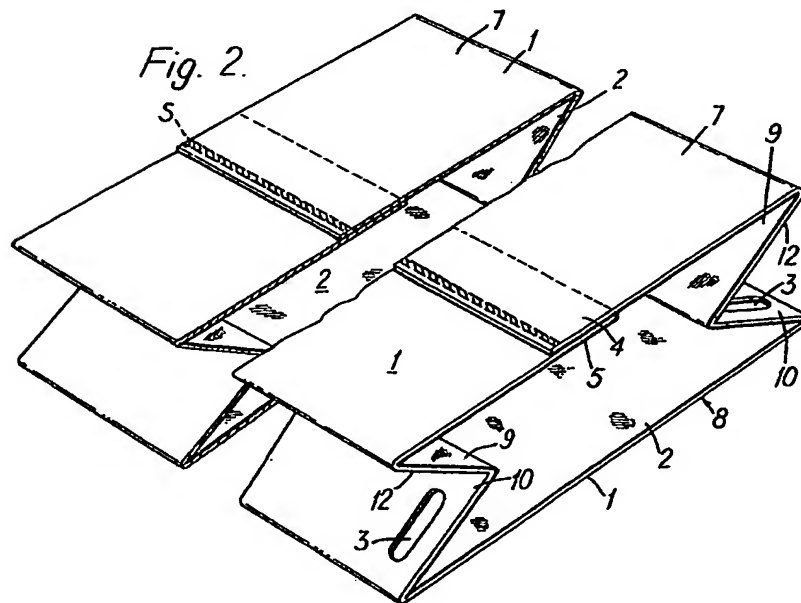
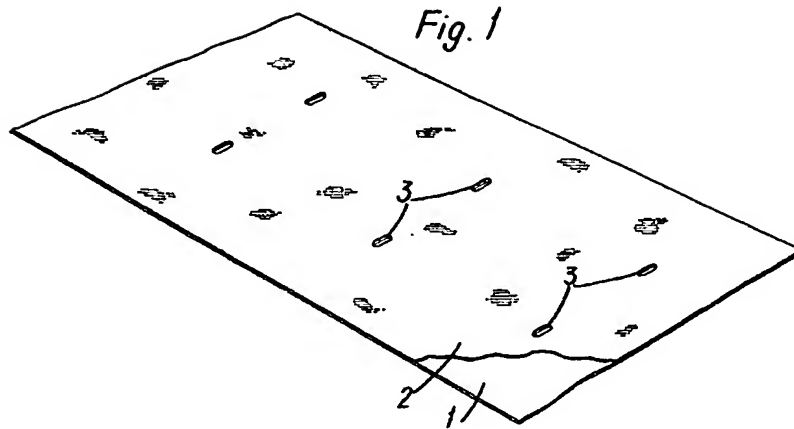
When the bag shown in Fig. 4 is in the set-up open condition thereof, it has the form shown in Fig. 5 and is of substantially rectangular cross-section throughout its length and has a bottom which is substantially at right angles of the length of the bag. During the setting-up of the bag the bottom-defining crease 13 folds about the lines 13a, 13b, 13c, 13d, Fig. 5, the lines 13b and 13d being those portions of crease 13 which were impressed into the gusset portions 9 and 10. The sloping seals 15, and if provided the creases 15a, constrain the portions 18 of the gussets to overlie the interior of the bottom of the bag and permit the gusset portions 9 and 10 on the opposite sides of the bag to open out fully along the full length of the bag as illustrated in Fig. 5.

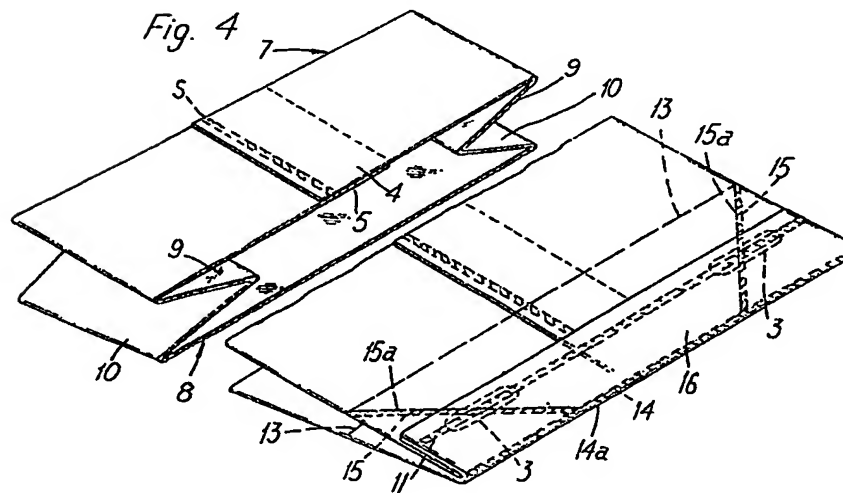
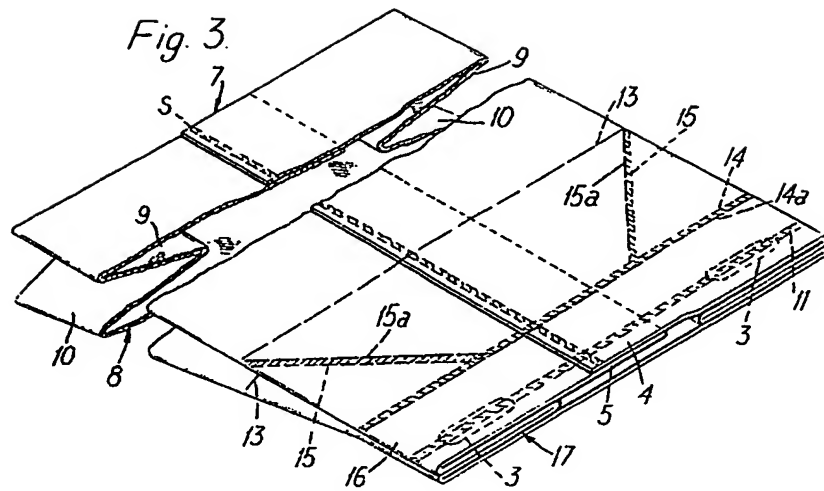
If desired, the crease 13 may be made in the material before folding thereof to form the tube, and when creases 15a are provided these also may be made before folding the

material to form the tube. Further, the crease
14a, when provided, may be either formed
before the folding of the material or by opera-
tion of folding the portion 16 to overlie the
5 side 7 of the bag.

PAGE, WHITE & FARRER,
Chartered Patent Agents,
27, Chancery Lane,
London, W.C.2,
Agents for the Applicants.

Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press.—1959.
Published by The Patent Office, 25, Southampton Buildings, London, W.C.2, from which
copies may be obtained.

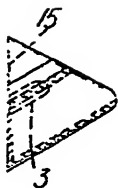
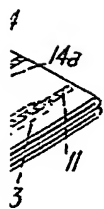


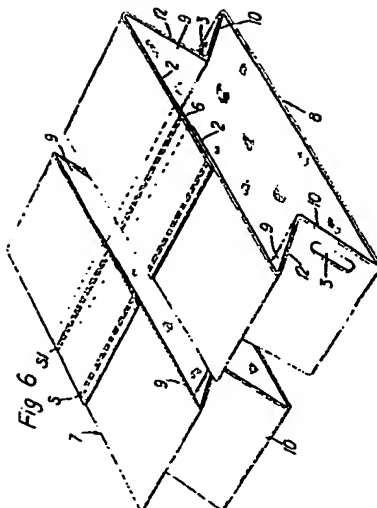
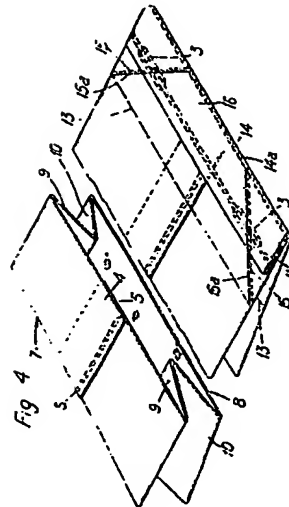
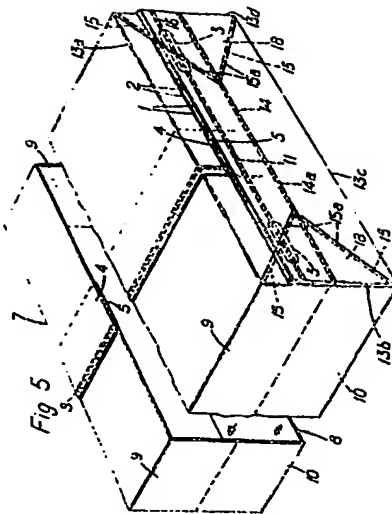
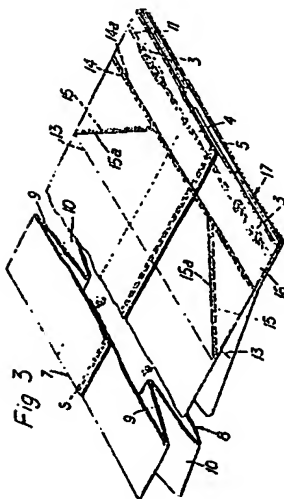


3 SHEETS

**This drawing is a reproduction of
the Original on a reduced scale.**

SHEETS 2 & 3





**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.